Polarimetric SAR Tomography using PolSARpro (Practical Session D5P1a)

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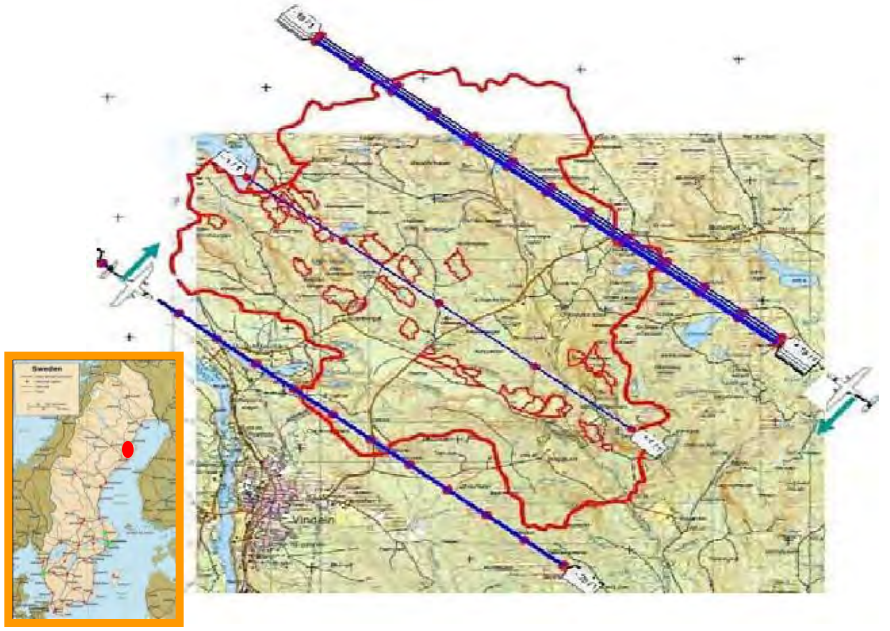
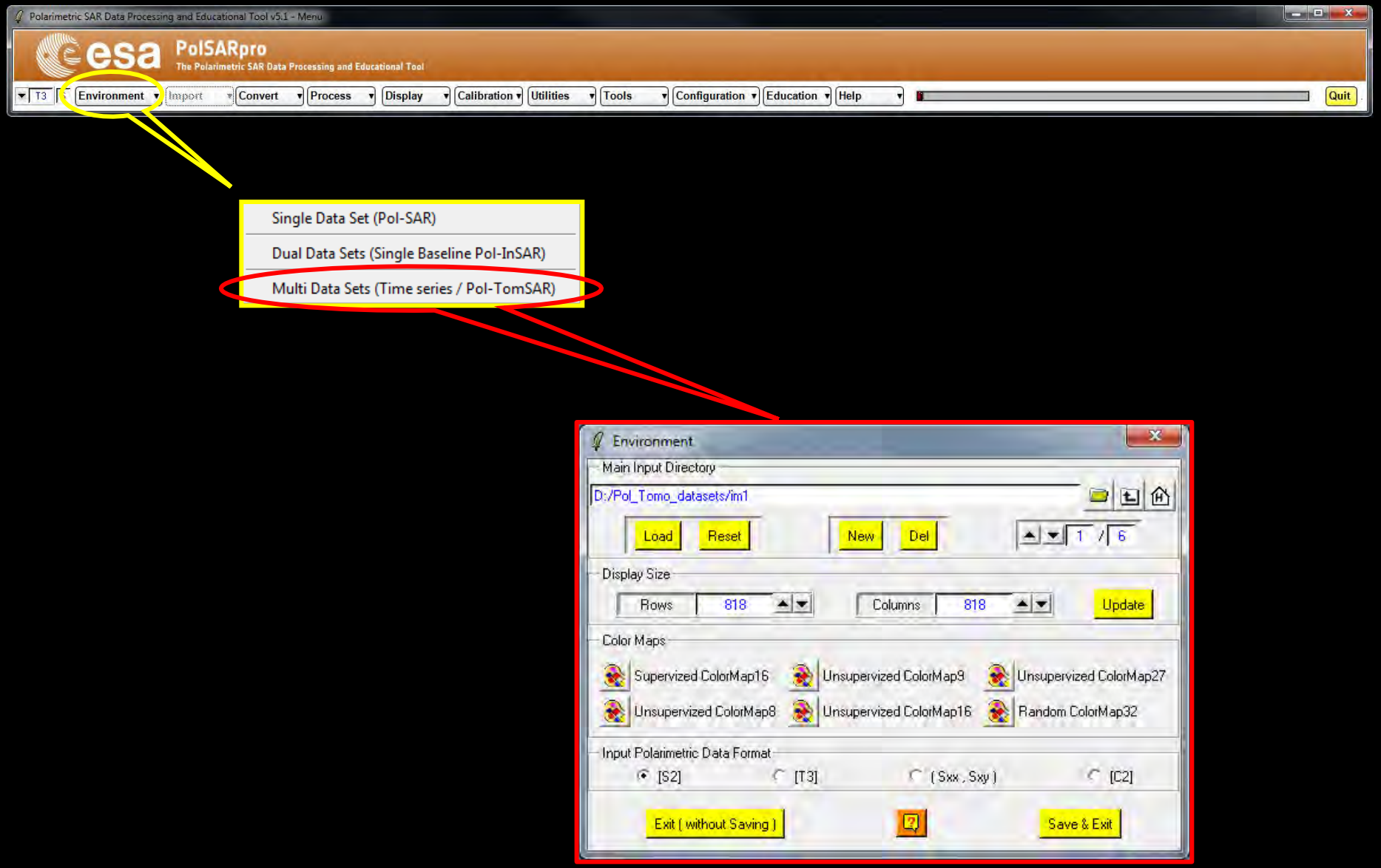
University of Rennes 1

DATASETS

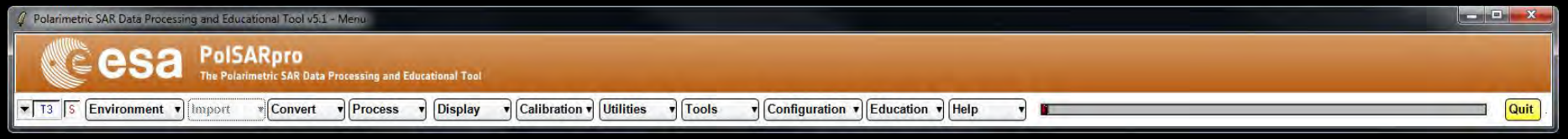
Campaign	BioSAR 2008 - ESA
System	E-SAR - DLR
Site	Krycklan river catchment, Northern Sweden
Scene	Boreal forest Pine, Spruce, Birch, Mixed stand
Topography	Hilly
Tomographic Tracks	6 + 6 – Fully Polarimetric (South-West and North-East)
Carrier Frequency	P-Band and L-Band
Slant range resolution	1.5 m
Azimuth resolution	1.6 m
Vertical resolution (P-Band)	20 m (near range) to >80 m (far range)
Vertical resolution (L-Band)	6 m (near range) to 25 m (far range)



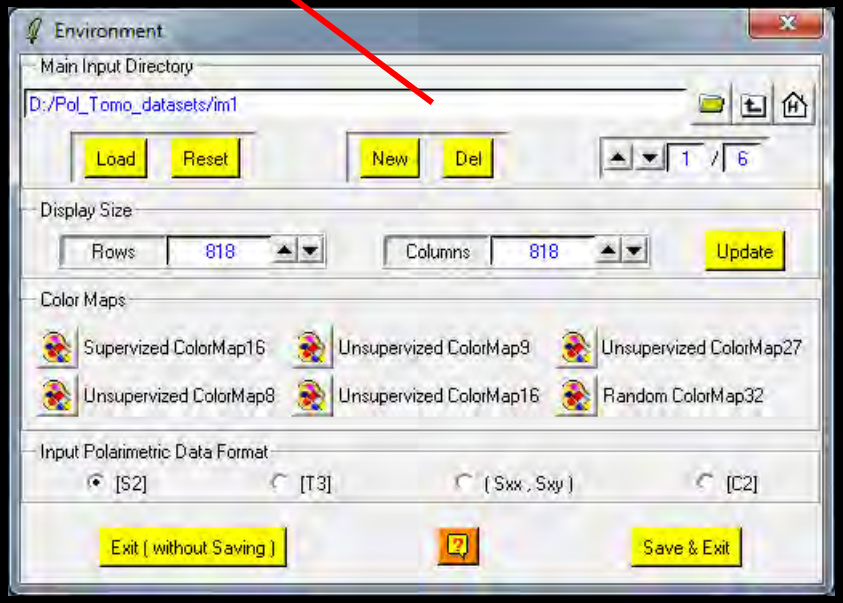
MAIN MENU


Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu
esa PolSARpro
The Polarimetric SAR Data Processing and Educational Tool
T3
Environment
Import
Convert
Process
Display
Calibration
Utilities
Tools
Configuration
Education
Help
Quit
Single Data Set (Pol-SAR)
Dual Data Sets (Single Baseline Pol-InSAR)
Multi Data Sets (Time series / Pol-TomSAR)
Environment
Main Input Directory
D:/Pol_Tomo_datasets/im1
Load
Reset
New
Del
1 / 6
Display Size
Rows
818
Columns
818
Update
Color Maps
Supervized ColorMap16
Unsupervized ColorMap9
Unsupervized ColorMap27
Unsupervized ColorMap8
Unsupervized ColorMap16
Random ColorMap32
Input Polarimetric Data Format
[S2]
[T3]
(Sxx , Sxy)
[C2]
Exit (without Saving)
Save & Exit

ENVIRONMENT

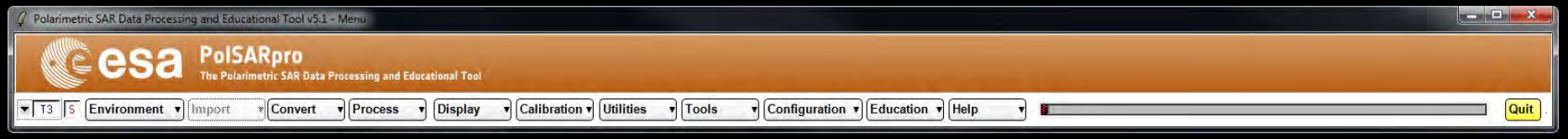


Configure Data Main Directory location



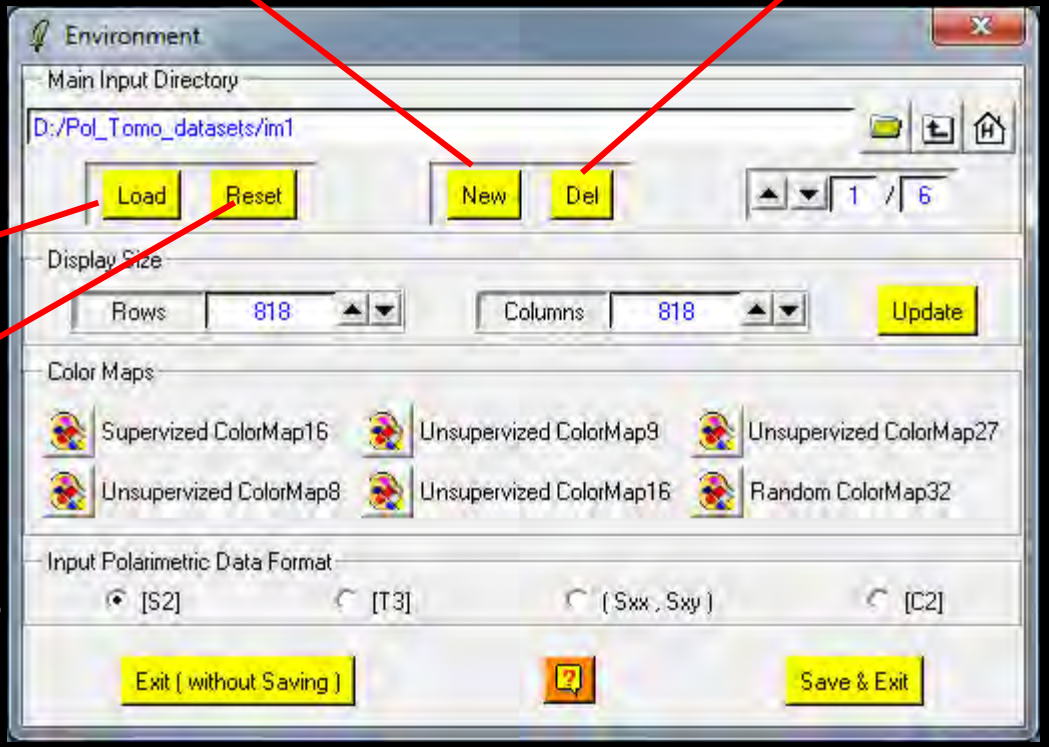
Input Directory: C:/ …/Pol_Tomo_datasets/im1

ENVIRONMENT



Add a new Data Directory

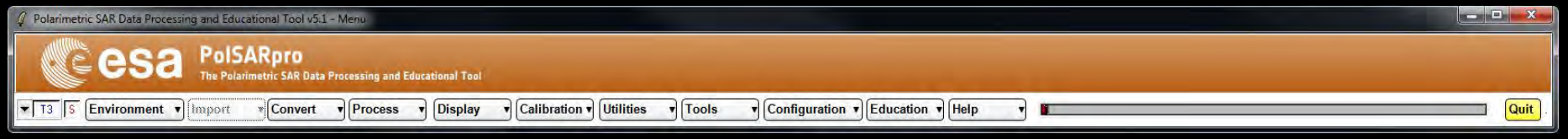
Delete a Data Directory



Load a predefined list of Data Directories

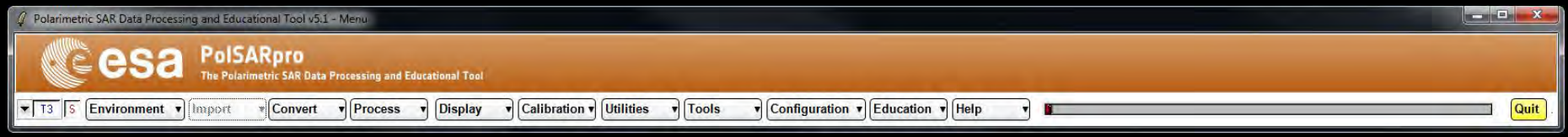
Reset the list of the Data Directories

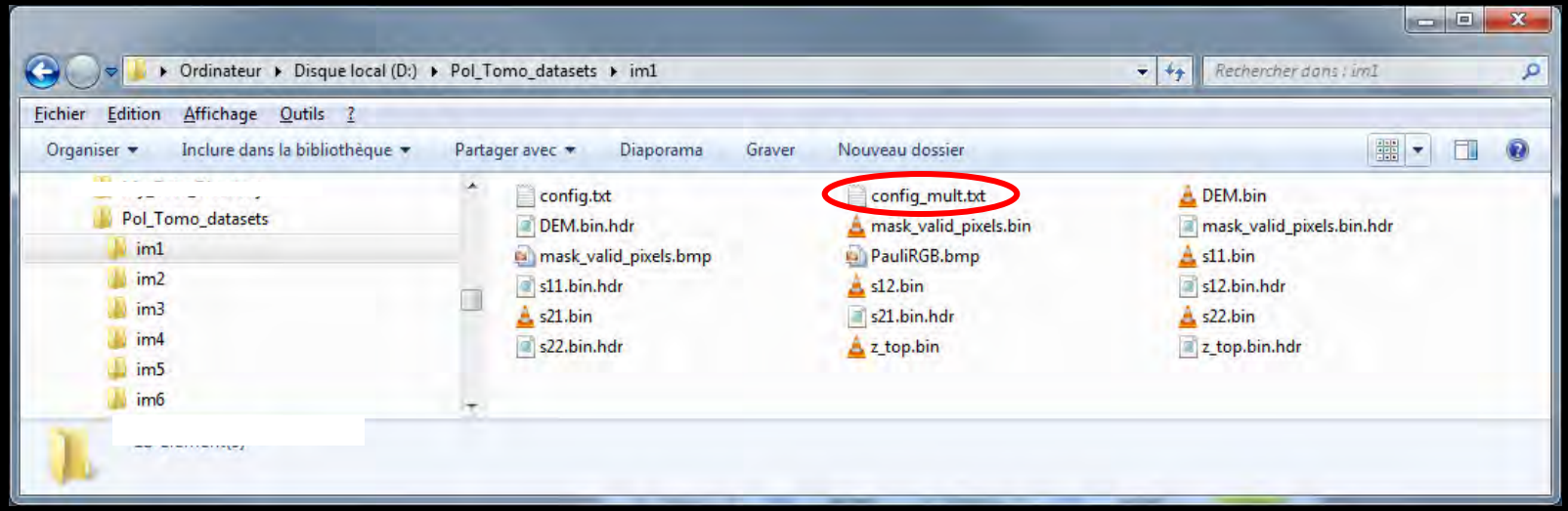
ENVIRONMENT

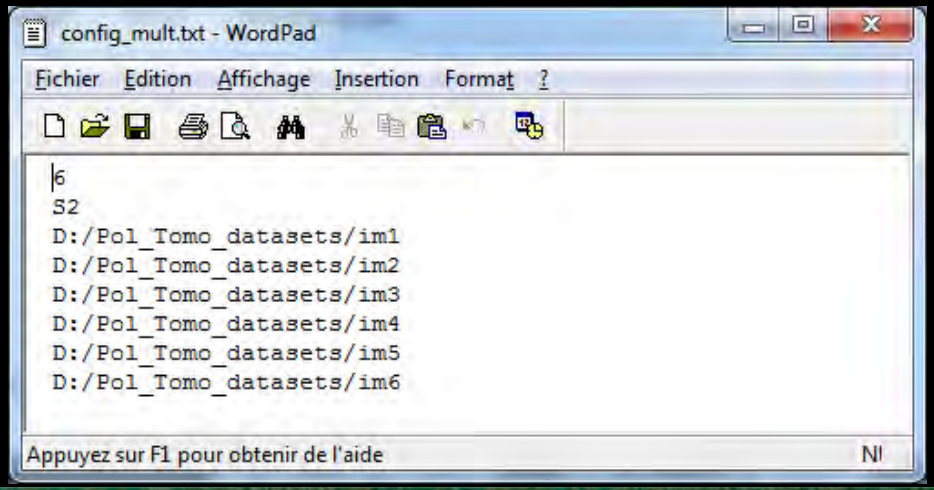


Pol_Tomo_datasets/im1
Pol_Tomo_datasets/im2
Pol_Tomo_datasets/im3
Pol_Tomo_datasets/im4
Pol_Tomo_datasets/im5
Pol_Tomo_datasets/im6

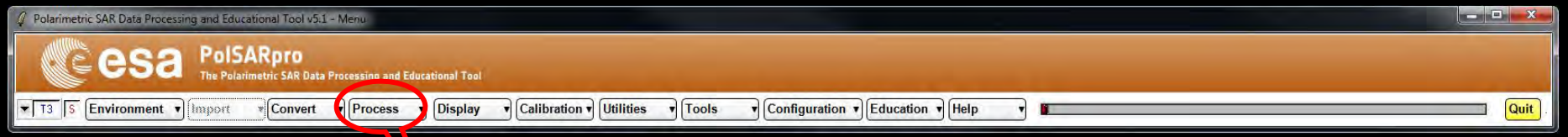
ENVIRONMENT





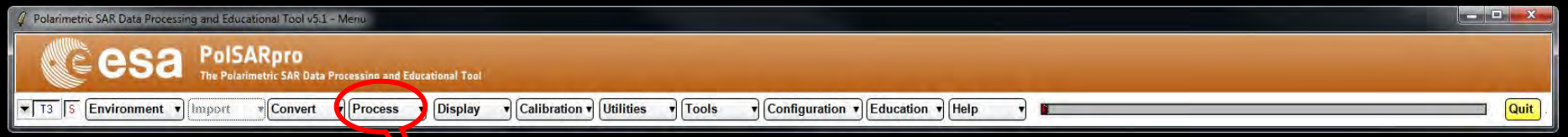


PROCESS DATA



- Coarse Co-Registration
- Matrix Elements
- Polarimetric Speckle Filter
  - Box Car Filter
  - C. Lopez Filter
  - Gaussian Filter
  - IDAN Filter
  - J.S. Lee Refined Filter
  - J.S. Lee Sigma Filter
- H / A / Alpha Decomposition
  - Decomposition Parameters
  - Eigenvector Set Parameters
  - Eigenvalue Set Parameters
- Polarimetric Segmentation
  - H / A / Alpha Classification
  - H / A / Alpha - Wishart Classification
  - Wishart Supervised Classification
- Polarimetric Functionalities
  - Faraday Rotation Estimation
  - Conformity Coefficient
  - Scattering Predominance
  - Scattering Diversity
  - Degree of Purity
  - Depolarisation Index
  - Alpha Approximation (Praks & Colin)
  - Entropy Approximation (Praks & Colin)
  - Scattering Mechanisme Entropy (Freeman)
  - Scattering Mechanisme Entropy (Van Zyl)
  - Kozlov Anisotropy
  - Lueneburg Anisotropy
  - Polarized Point Scatterer Detection
  - Reflectivity Ratio
  - Differential Reflectivity (ZDR)
- Polarimetric Tomography
- Multi-Datasets Analysis
  - Avg / Std / CV
  - Time / Freq Averaging
  - Animated GIF

PROCESS DATA



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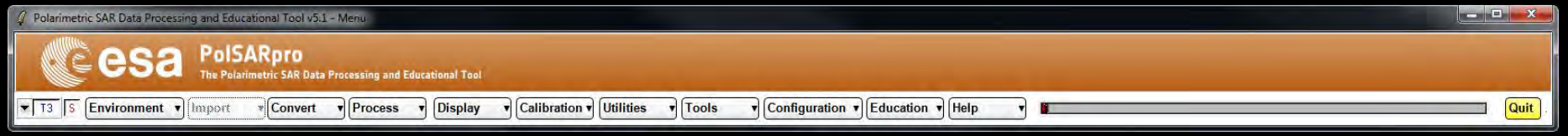
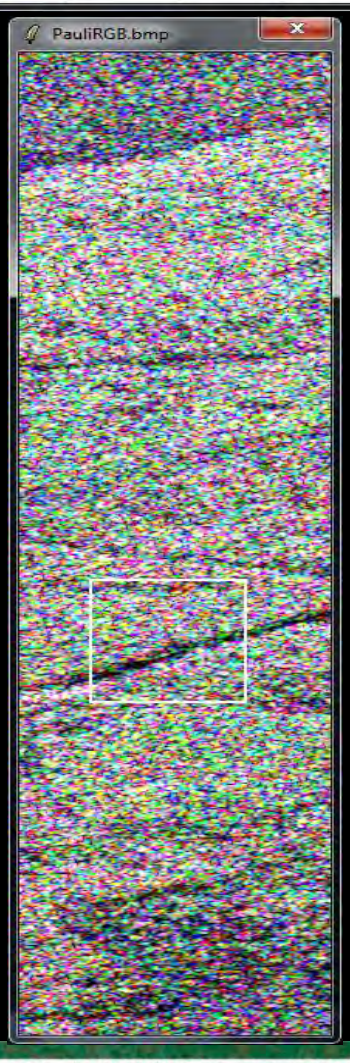
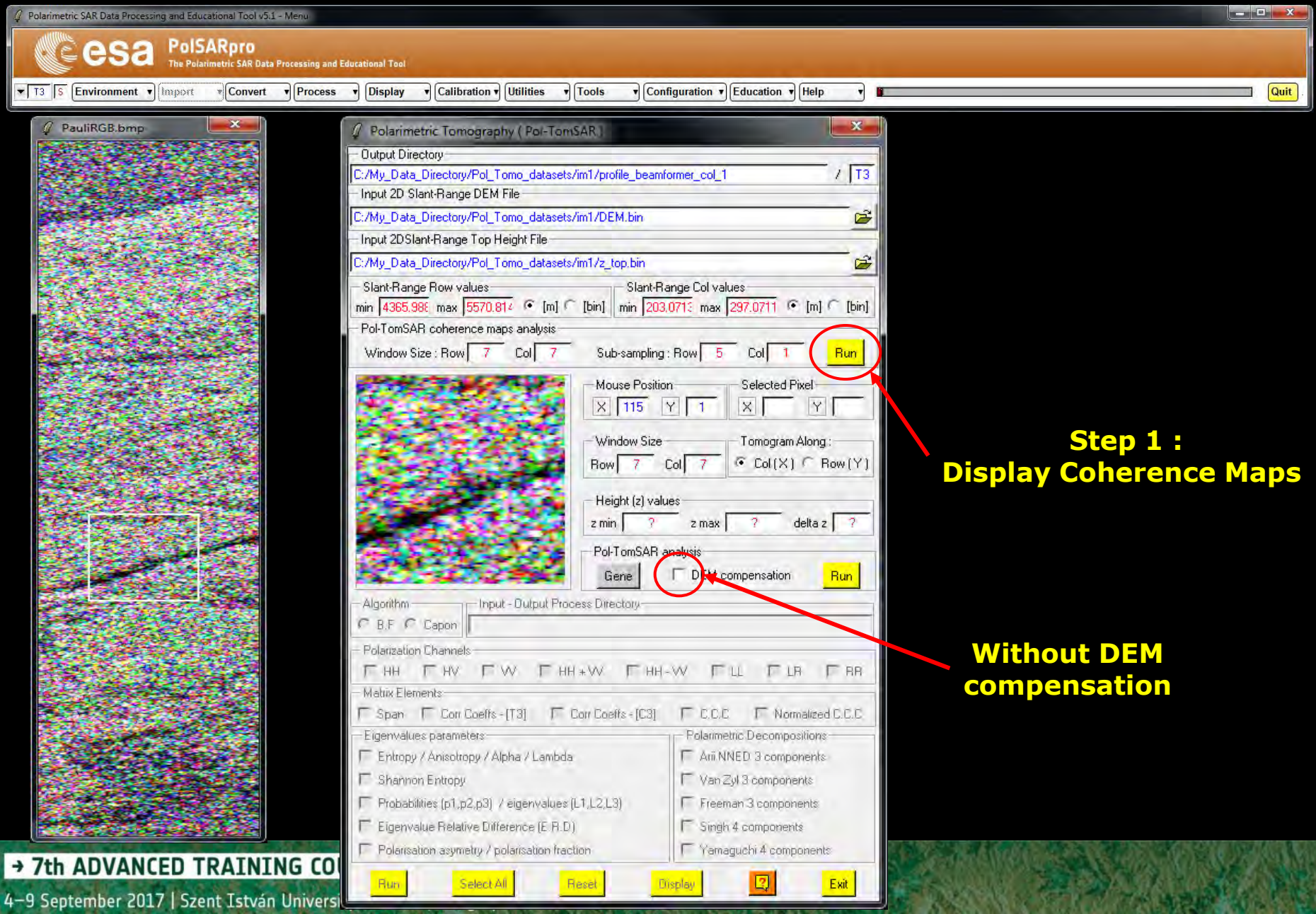
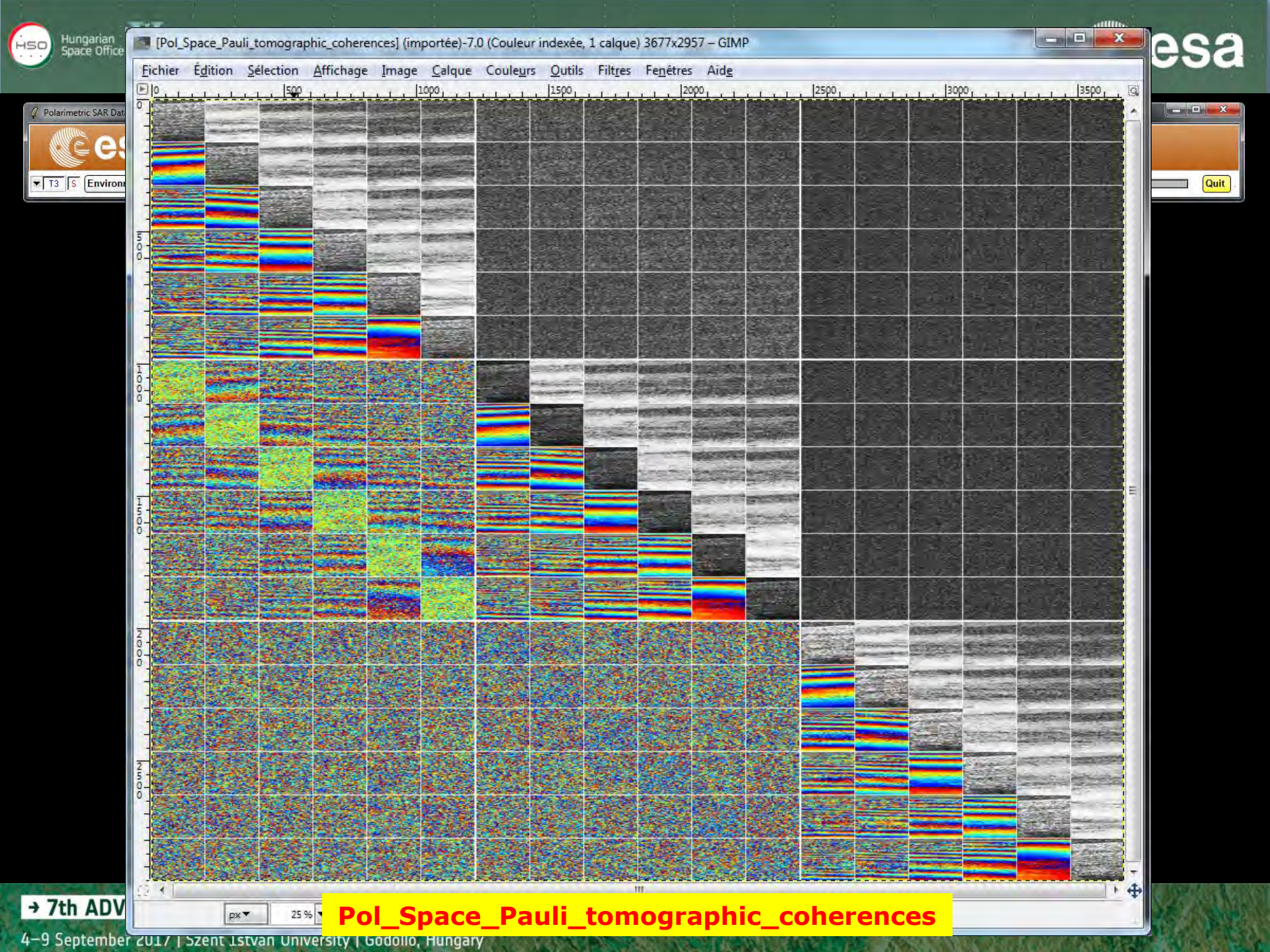


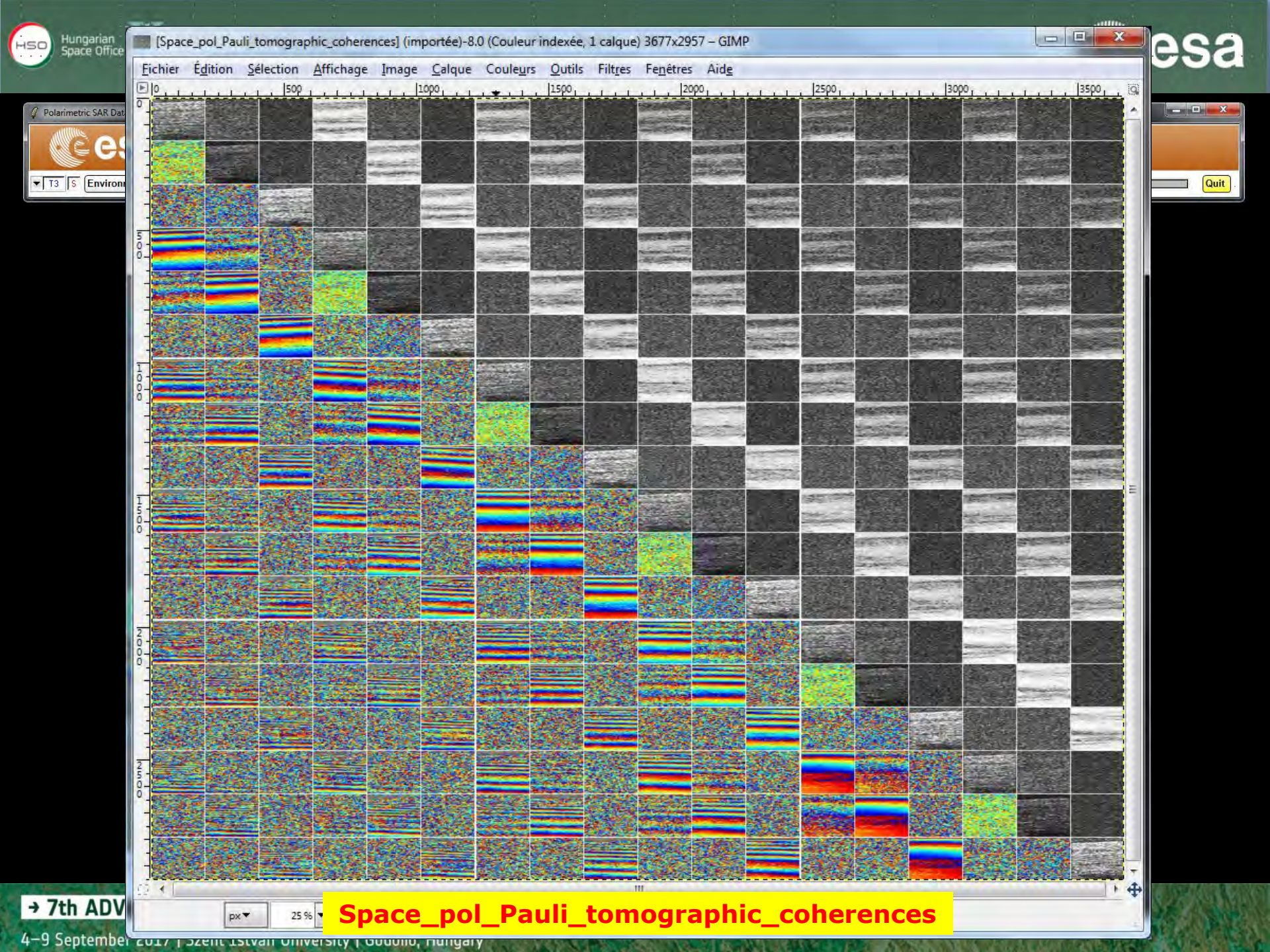


Step 0 :
Open a BMP file

PROCESS DATA




[Pol_Space_Pauli_tomographic_coherences] (importée)-7.0 (Couleur indexée, 1 calque) 3677x2957 – GIMP
Fichier Édition Sélection Affichage Image Calque Couleurs Outils Filtres Fenêtres Aide
Pol_Space_Pauli_tomographic_coherences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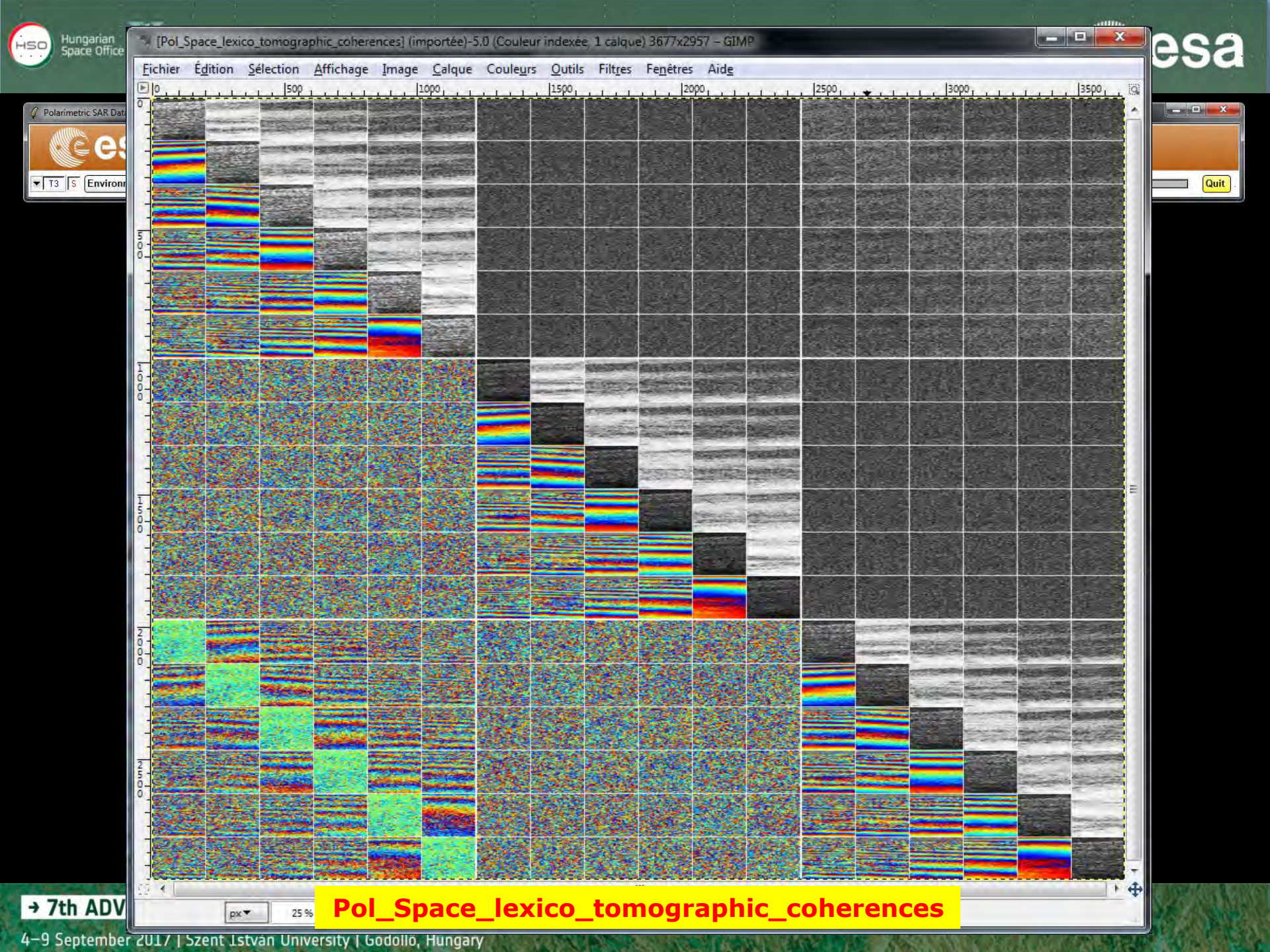
Space_pol_Pauli_tomographic_coherences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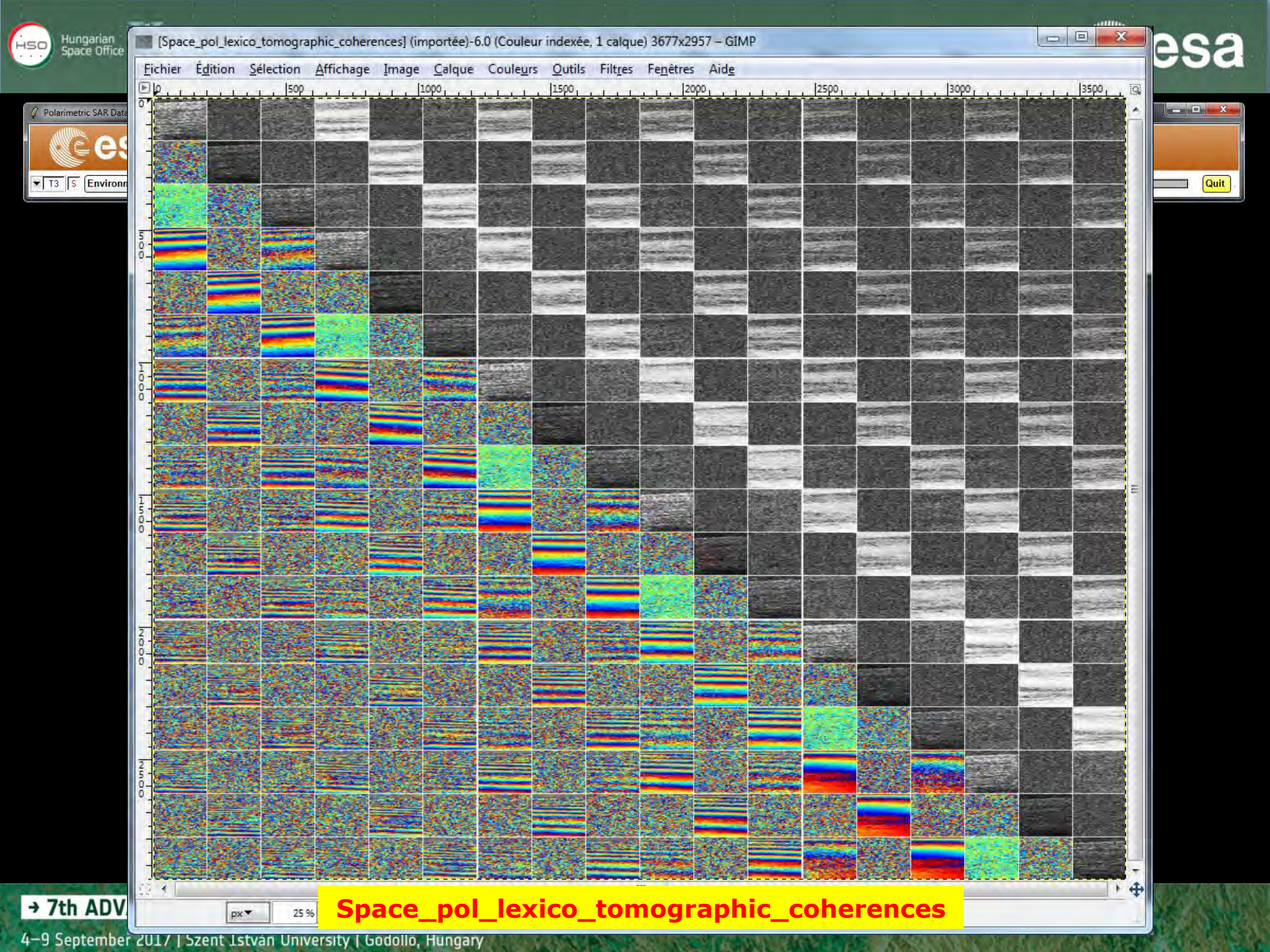
Fichier Édition Sélection Affichage Image Calque Couleurs Outils Filtres Fenêtres Aide
Pol_Space_lexico_tomographic_coherences
Hungarian Space Office
esa
Quit
7th ADV
4–9 September 2017 | Szent István University | Gödöllő, Hungary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Fichier Édition Sélection Affichage Image Calque Couleurs Outils Filtres Fenêtres Aide
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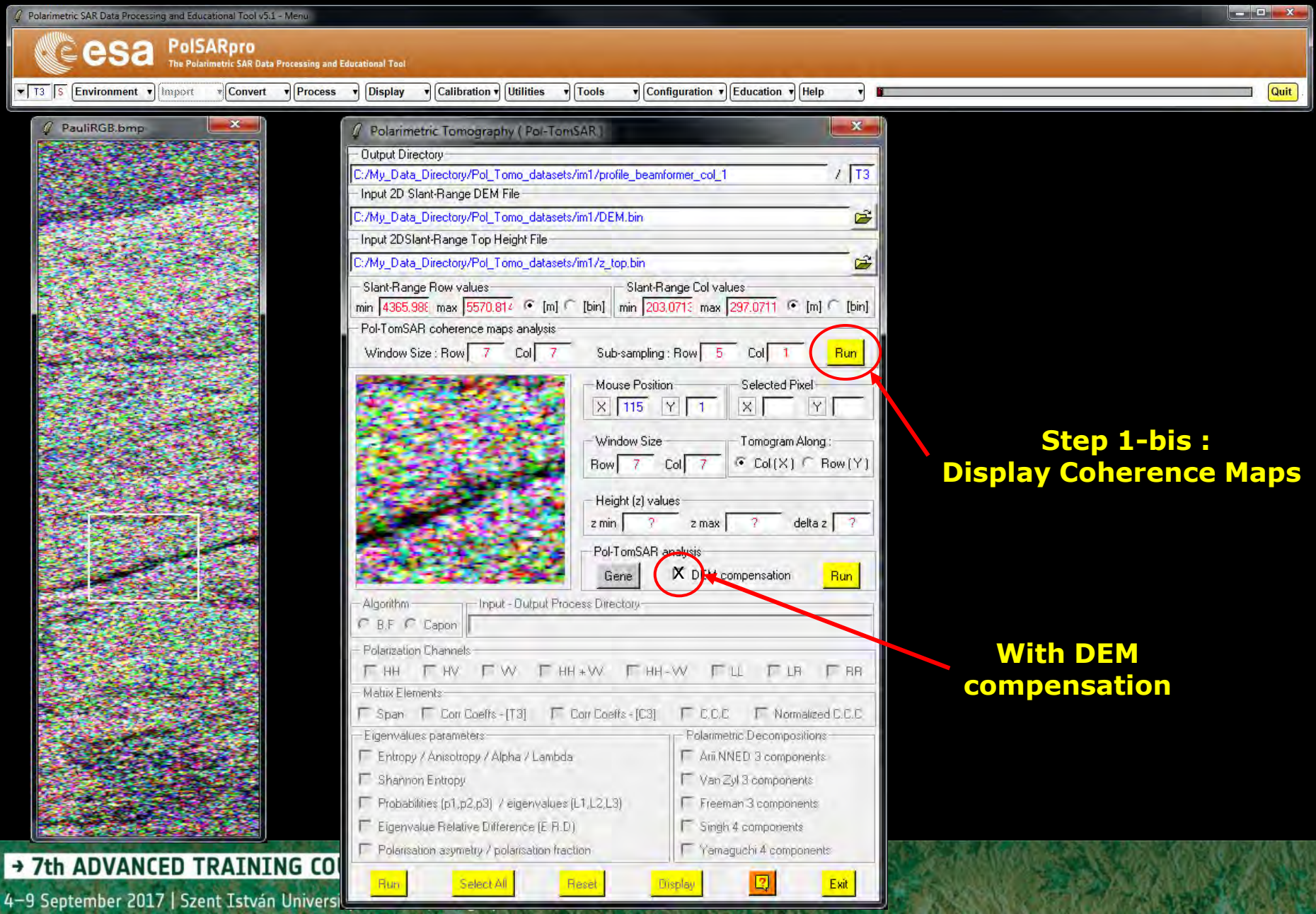
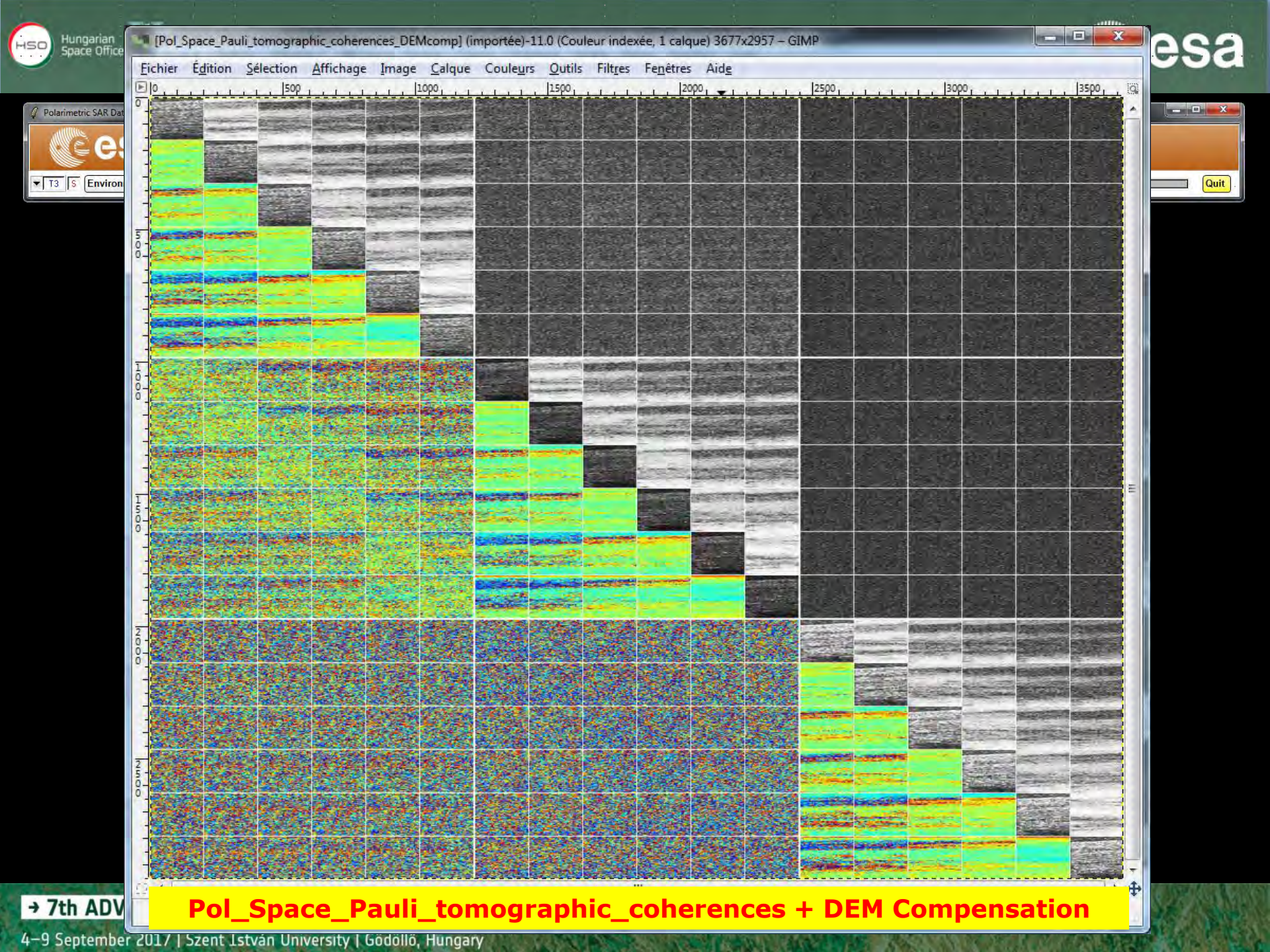
PROCESS DATA



Step 1-bis : Display Coherence Maps

With DEM compensation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Fichier Édition Sélection Affichage Image Calque Couleurs Outils Filtres Fenêtres Aide
Pol_Space_Pauli_tomographic_coherences + DEM Compensation
Hungarian Space Office
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Polarimetric SAR Dat
Quit
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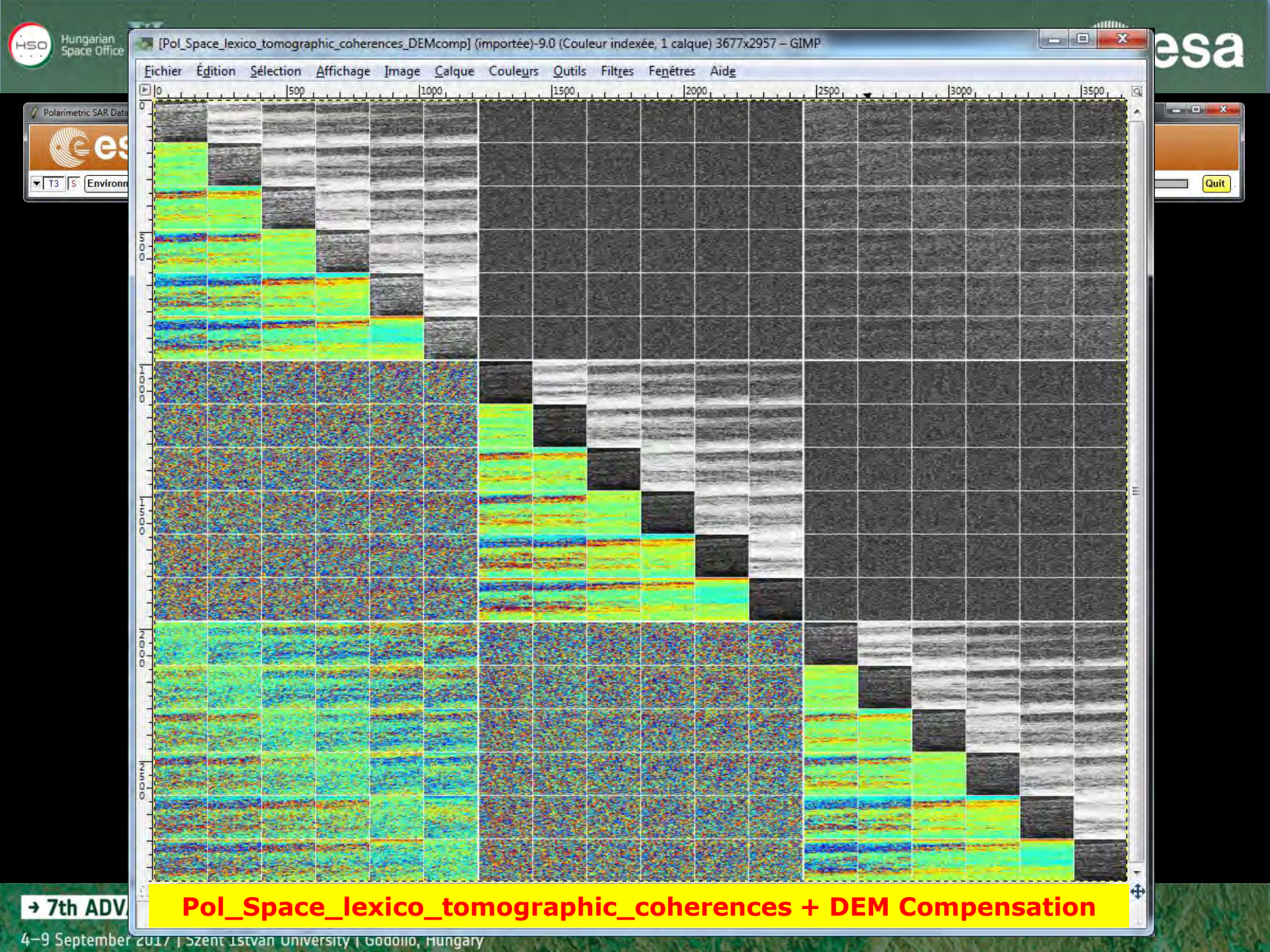
[Space_pol_Pauli_tomographic_coherences_DEMcomp] (importée)-12.0 (Couleur indexée, 1 calque) 3677x2957 – GIMP
Fichier Édition Sélection Affichage Image Calque Couleurs Outils Filtres Fenêtres Aide
Space_pol_Pauli_tomographic_coherences + DEM Compensation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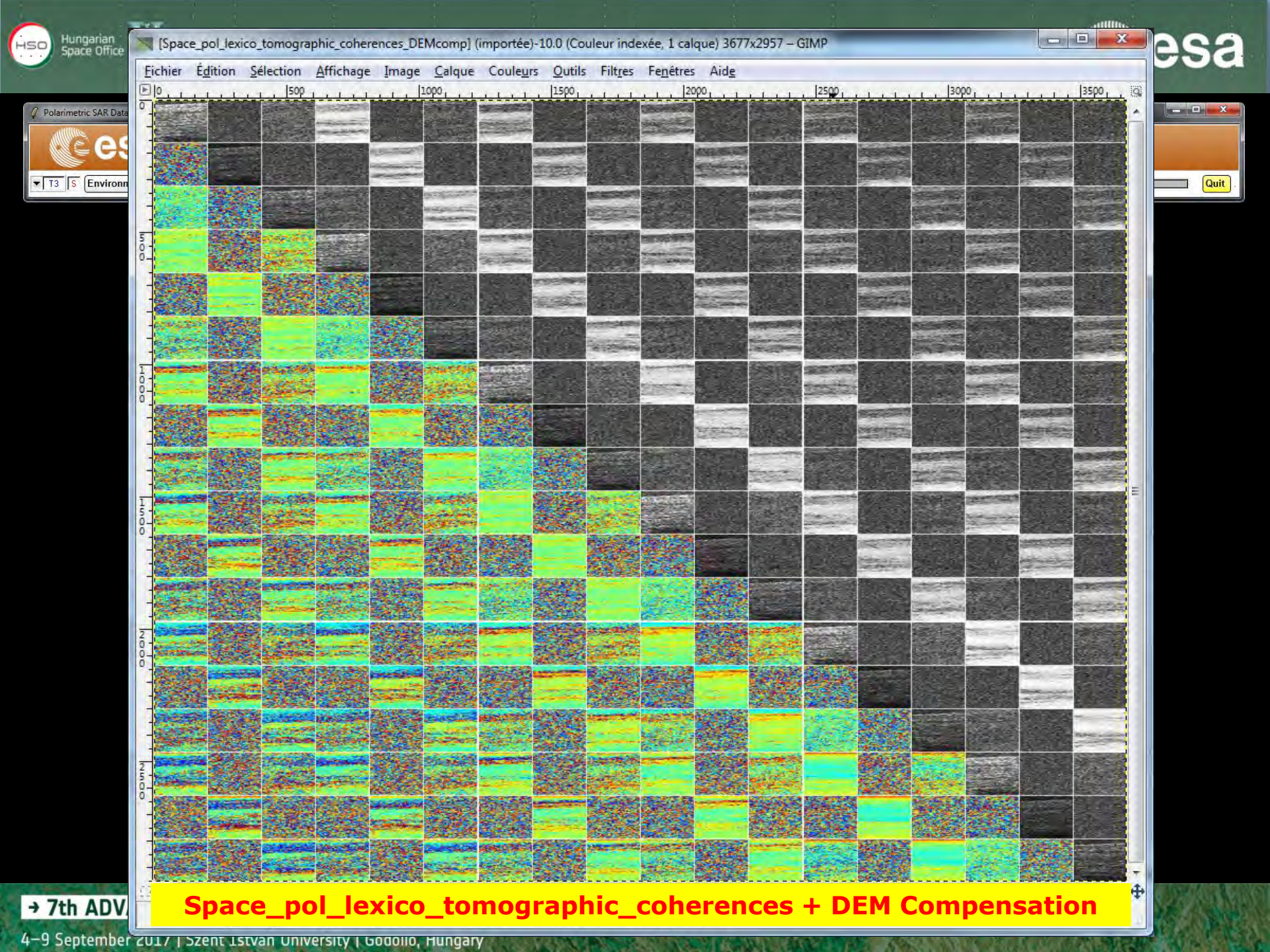
Fichier Édition Sélection Affichage Image Calque Couleurs Outils Filtres Fenêtres Aide
Pol_Space_lexico_tomographic_coherences + DEM Compensation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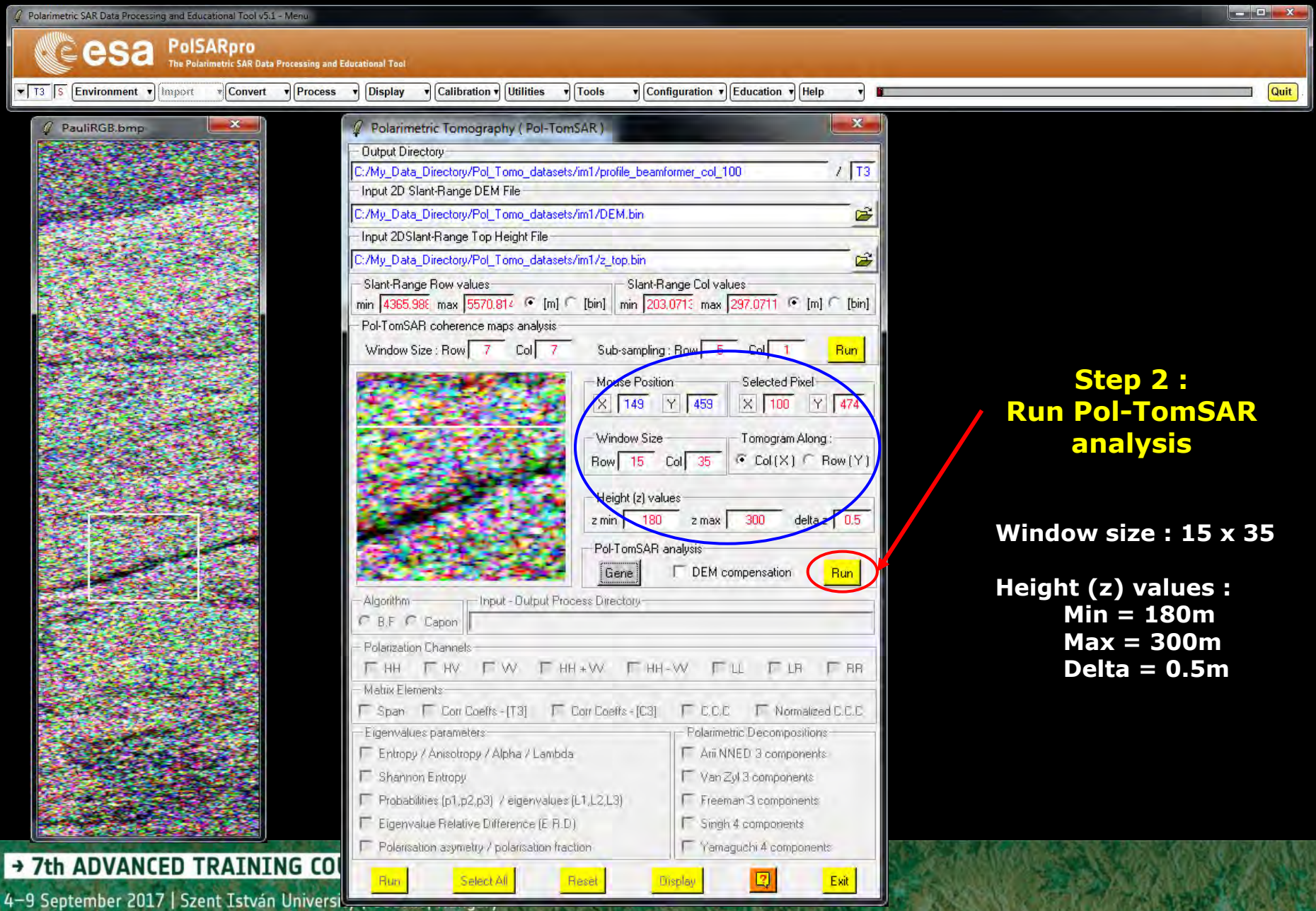
Fichier Édition Sélection Affichage Image Calque Couleurs Outils Filtres Fenêtres Aide
Space_pol_lexico_tomographic_coherences + DEM Compensation

PROCESS DATA

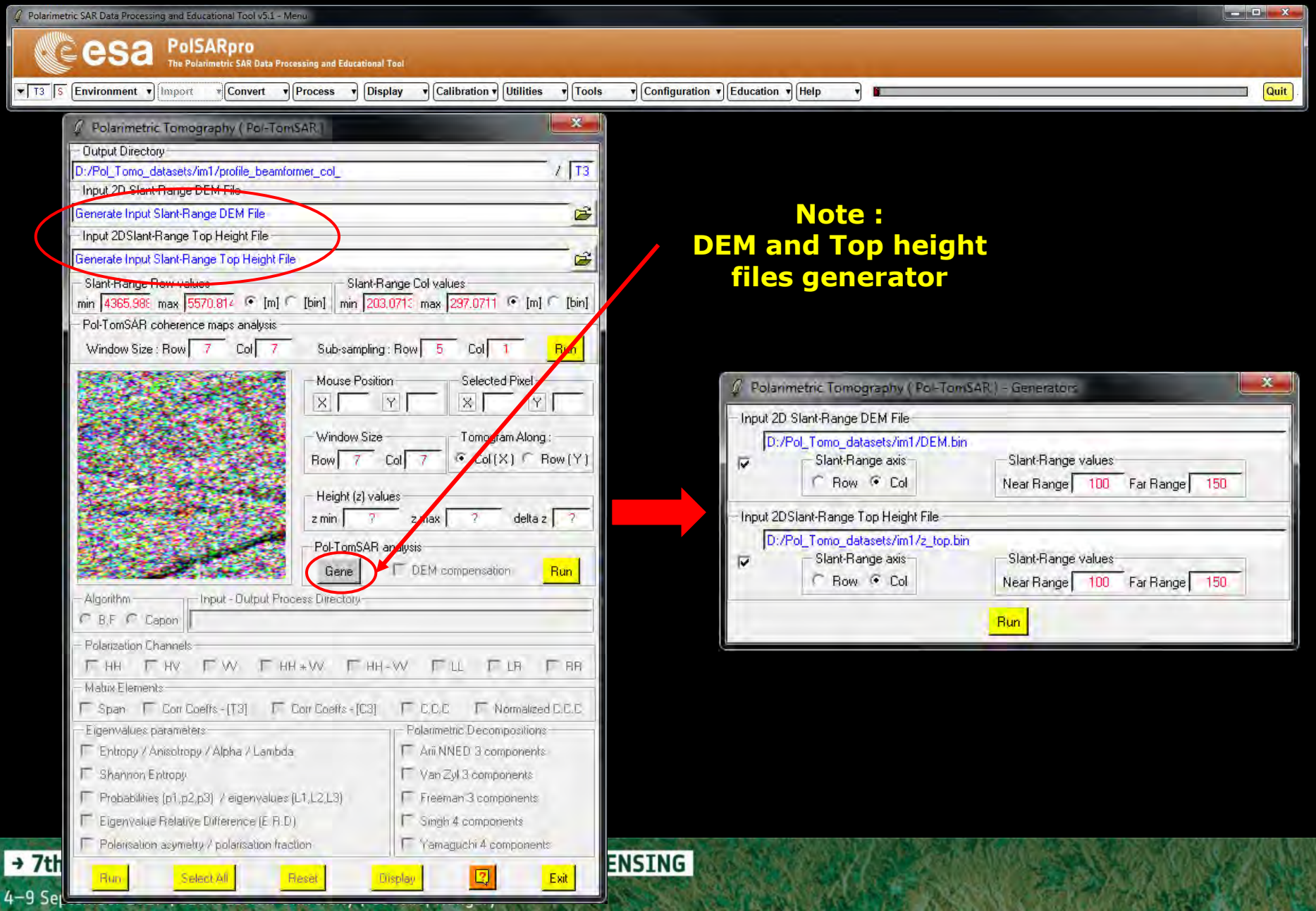


Step 2 :
Run Pol-TomSAR analysis

Window size : 15 x 35

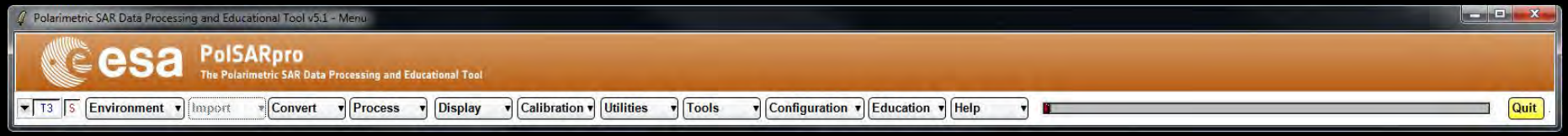
Height (z) values :
Min = 180m
Max = 300m
Delta = 0.5m

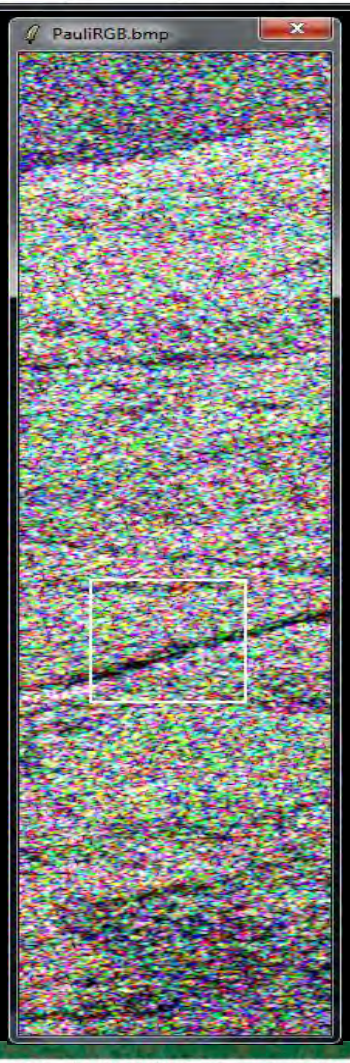
PROCESS DATA



Note :
DEM and Top height files generator

PROCESS DATA





Output Directories

C:/Pol-Tomo_datasets/im1/profile_beamformer_col_100

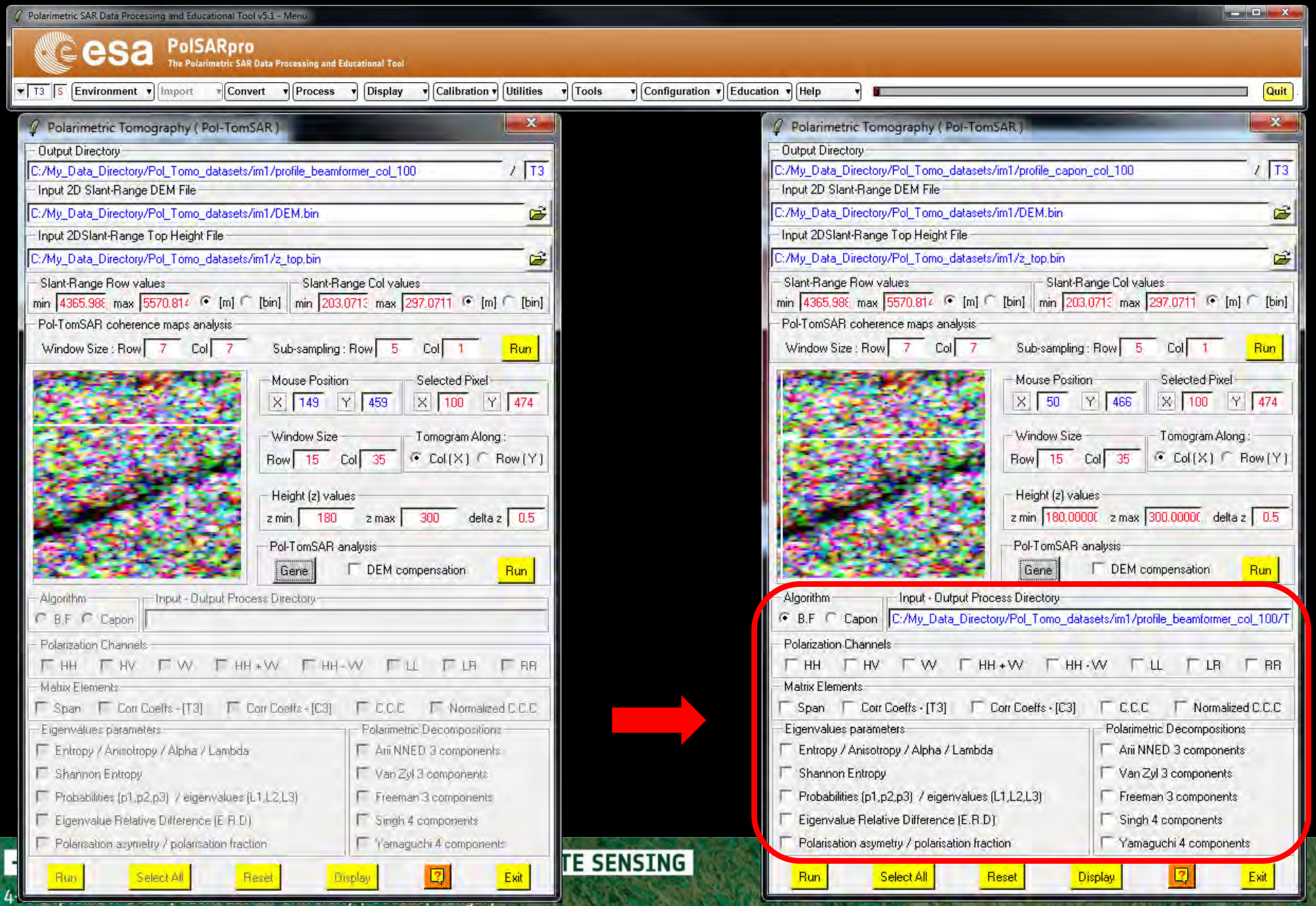
C:/Pol-Tomo_datasets/im1/profile_capon_col_100

process

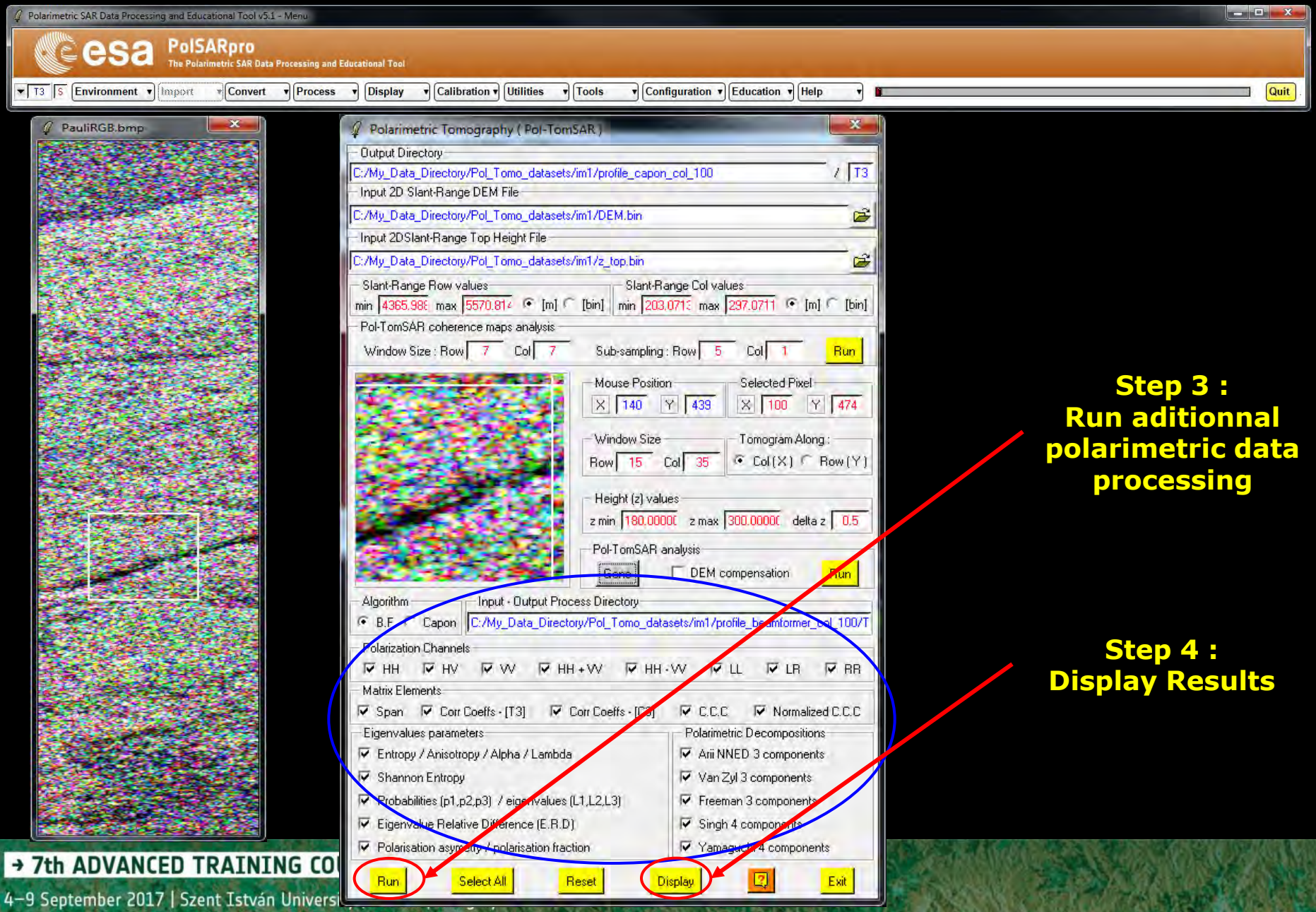
col / row

number

PROCESS DATA



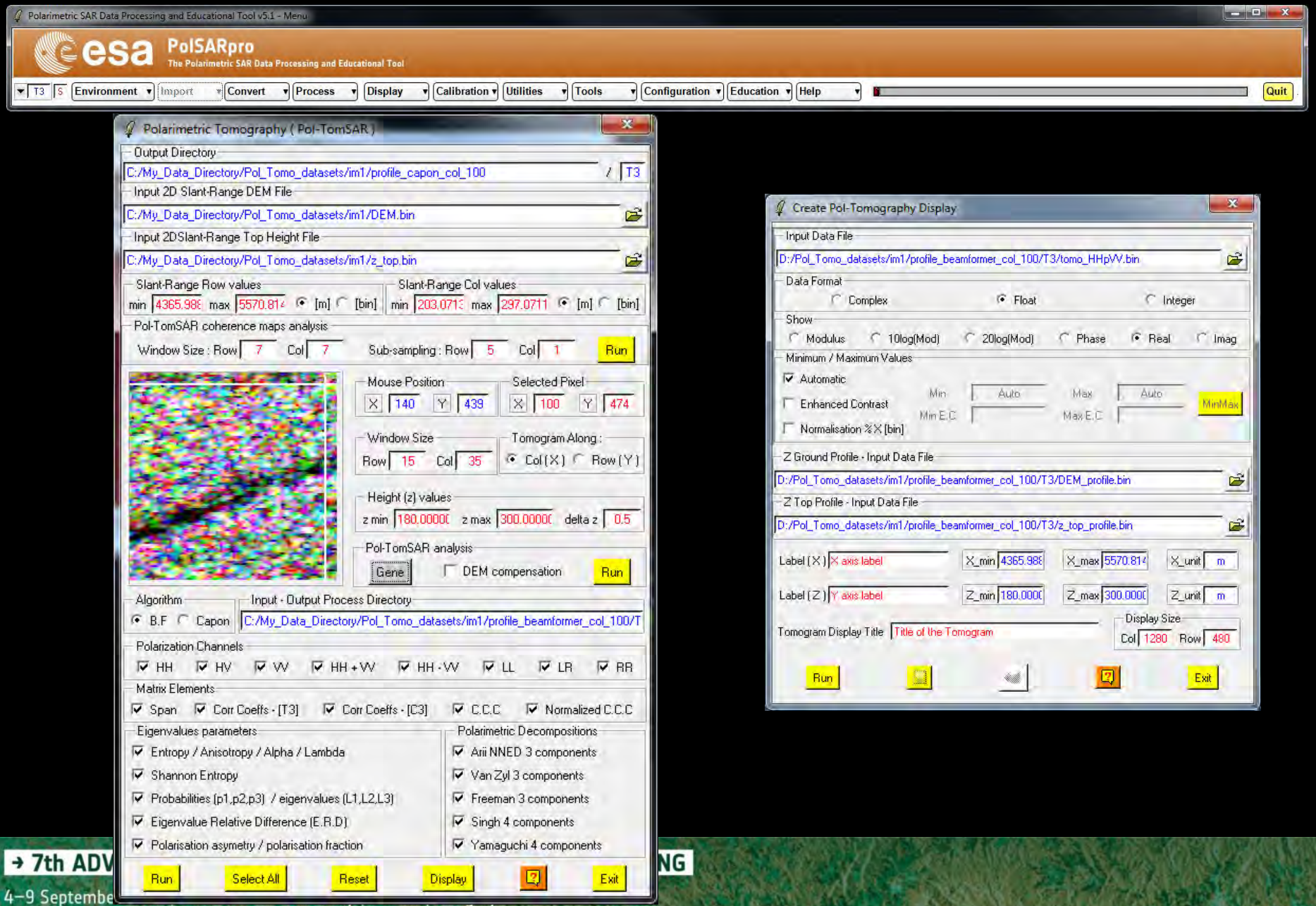
PROCESS DATA



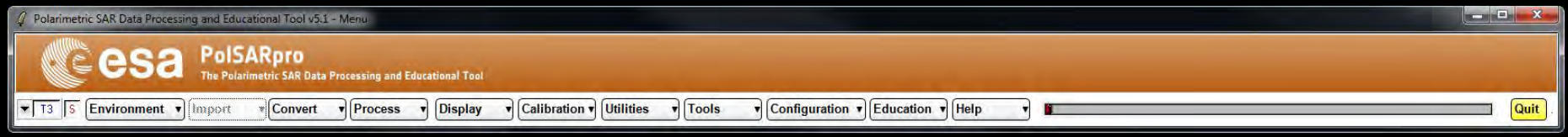
Step 3 :
Run aditionnal polarimetric data processing

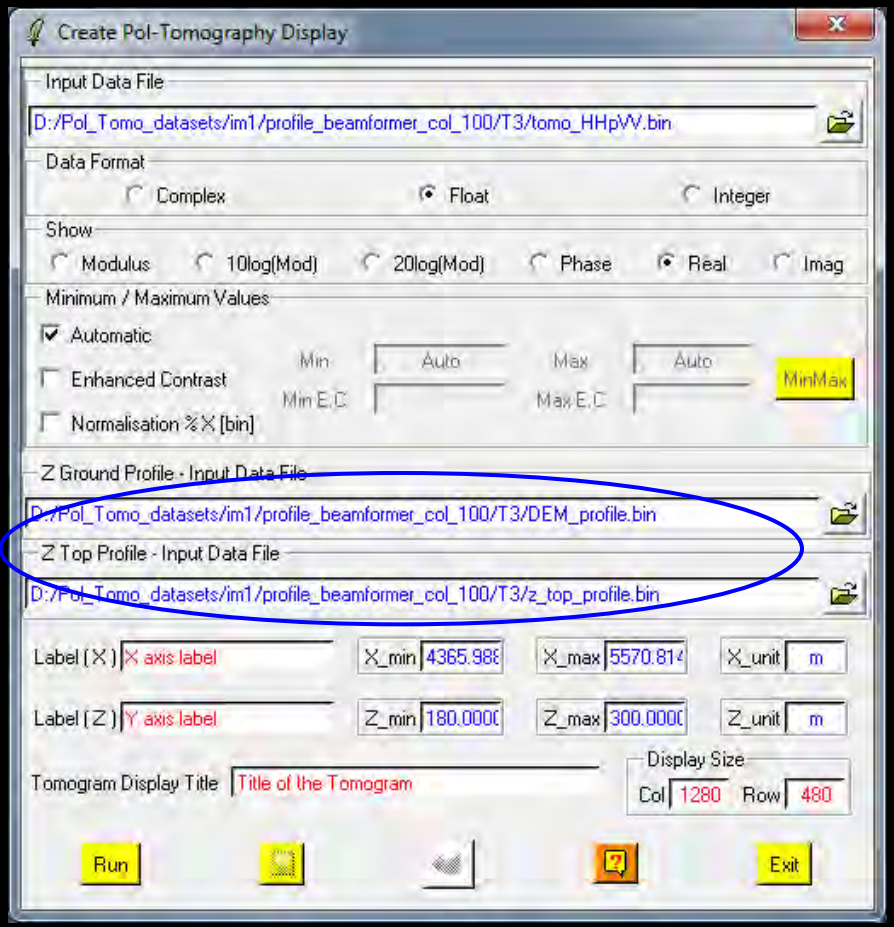
Step 4 :
Display Results

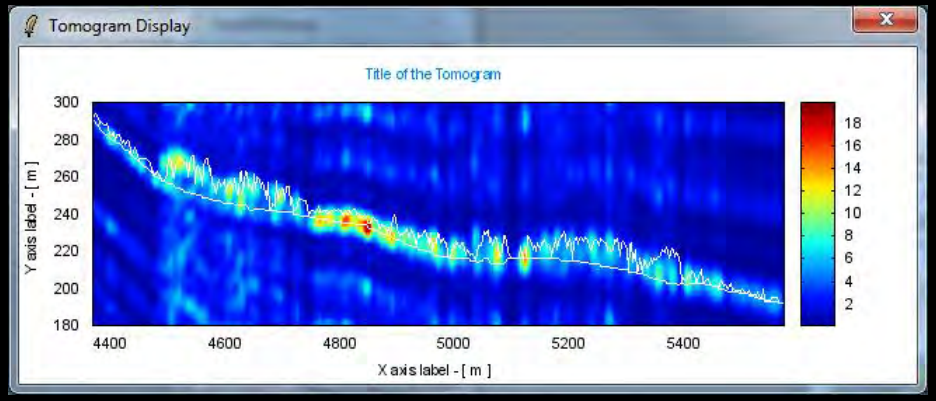
PROCESS DATA

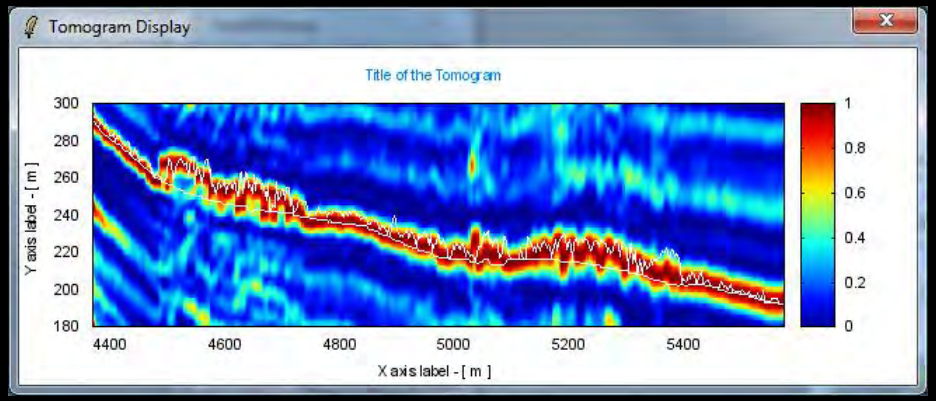


PROCESS DATA









Questions ?